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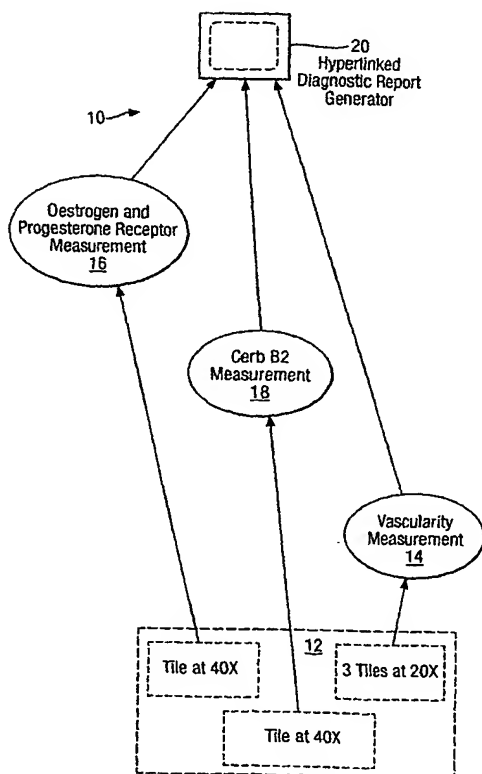
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[Continued on next page]

(54) Title: HISTOLOGICAL ASSESSMENT



(57) Abstract: A method of measuring oestrogen or progesterone receptor (ER or PR) comprises identifying in histopathological specimen image data pixel groups indicating cell nuclei, and deriving image hue and saturation. The image is thresholded using hue and saturation and preferentially stained cells identified. ER or PR status is determined from normalised average saturation and proportion of preferentially stained cells. A method of measuring C-erb-2 comprises correlating window functions with pixel sub-groups to identify cell boundaries, computing measures of cell boundary brightness and sharpness and brightness extent around cell boundaries, and comparing the measures with comparison images associated with different values of C-erb-2. A C-erb-2 value associated with a comparison image having similar brightness-related measures is assigned. A method of measuring vascularity comprises deriving image hue and saturation, producing a segmented image by hue and saturation thresholding and identifying contiguous pixels. Vascularity is determined from contiguous pixel area corresponding to vascularity expressed as a proportion of total image area.



SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA,
UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

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Declaration under Rule 4.17:

- of inventorship (Rule 4.17(iv)) for US only

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INTERNATIONAL SEARCH REPORT

PCT/GB 03/03465

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 G01N15/10
//G06F19/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 G01N G01J G06T G06K G06F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the International search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 01/004828 A (ELLIS BOB ;MCLAREN GINA (US); CHROMAVISION MED SYS INC (US)) 18 January 2001 (2001-01-18) abstract page 17, line 9 - page 18, line 6 page 35, line 4 - page 36, line 16 page 51, line 1 - page 53, line 12 page 80, line 20 - page 85, line 9 page 88, line 1 - line 9 page 98, line 17 - page 99, line 12 page 105, line 1 - page 106, line 13 figure 2	1,6-10, 37,47
Y	----- -/--	2-5,38, 39,48-50

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
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"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"Z" document member of the same patent family

Date of the actual completion of the international search

5 February 2004

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16. 04. 2004

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INTERNATIONAL SEARCH REPORT

PCT/GB 03/03465

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>US 6 404 916 B1 (DE LA TORRE-BUENO JOSE) 11 June 2002 (2002-06-11) abstract column 2, line 36 - column 3, line 9 column 3, line 48 - line 67 column 4, line 36 - line 55 -----</p>	<p>1,6-10, 37,47</p>
Y	<p>US 2002/039434 A1 (HAGLER JOSEPH ET AL) 4 April 2002 (2002-04-04) abstract paragraph [0059] paragraph [0094] paragraph [0098] -----</p>	<p>2-5,38, 39,48-50</p>

INTERNATIONAL SEARCH REPORT

PCT/GB 03/03465

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this International application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.

2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1-15, 37-39, 47-50

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-15, 37-39, 47-50

Methods, programs and apparatuses for the determination of oestrogen or progesterone receptor (ER or PR) status

2. claims: 18-30, 40-43, 51-54, 16

Method, program and apparatus for the determination of C-erb-2 status

3. claims: 31-36, 44-46, 55-56, 17

Method, program and apparatus for the determination of vascularity

INTERNATIONAL SEARCH REPORT

PCT/GB 03/03465

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 0104828	A	18-01-2001	AU 6093400 A EP 1203343 A1 JP 2003504627 T WO 0104828 A1 US 6546123 B1	30-01-2001 08-05-2002 04-02-2003 18-01-2001 08-04-2003
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US 2002039434	A1	04-04-2002	NONE	